LG Chem Yeosu Complex	Material Safety Data Sheet	Identity No.	GHS – 3AA - 005
	2-ETHYLHEXYL ACRYLATE (CAS No. : 103-11-7)	Pages	1/10

1. Identification of the product and the supplier

1) Product name : 2-ETHYLHEXYL ACRYLATE

2) Advisable use and Restriction
- ○ Advisable use :
  - monomer of plastic products, protective coating, paper treatments
  - production of water-soluble paint
  - coating materials, adhesives, printing Inks, cross-linking agent
- ○ Restriction of product using : Not available

3) Manufacturer/Supplier/Distributor information
- ○ Company : LG Chem, LTD. Acrylate plant
- ○ Address : 451, Sandanjungang-ro, Yeosu-si, Jeollanam-do
- ○ Emergency response number : 061-680-6910
- ○ Respondent : 3AA Team

2. Hazard identification

1) Hazard classification :

- Flammable liquid :	Category 4
- Acute toxicity (oral) :	Category 5
- Skin corrosion/irritation :	Category 2
- Skin sensitization :	Category 1
- Target Organ Systemic Toxicity(single exposure) :	Category 3 (respiratory irritation)
- Acute aquatic toxicity :	Category 2

2) Allocation label elements

○ Pictogram and symbol

○ Signal word : Warning

○ Hazard statement

H227 Combustible liquid
H303 May be harmful if swallowed
H315 Causes skin irritation
H317 May cause an allergic skin reaciton
H335 May cause respiratory irritation
H401 Toxic to aquatic life

○ Precautionary statements

- Prevention: P210: Keep away from flames and hot surfaces. - No smoking
  P280: Wear protective gloves/protective clothing/eye protection/face protection.
  P264: Wash thoroughly after handling.
  P272: Contaminated work clothing should not be allowed out of the workplace.
  P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
  P271: Use only outdoors or in a well-ventilated area.
  P273: Avoid release to the environment.

- Response: P370+P378: In case of fire: Use for extinction.
  P312: Call a POISON CENTER or doctor/physician if you feel unwell.
  P302+P352+P321: IF ON SKIN: Wash with plenty of soap and water. Specific treatment.
  P332+P333+P313: If skin irritation occurs or a rash occurs : Get medical advice/attention.
  P362+P363: Take off contaminated clothing and wash before reuse. Wash contaminated clothing before reuse.
  P304+P340: If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
  P391: Collect spillage.

- Storage : P403+P235+P233 : Store in a well-ventilated place. Keep container tightly closed and cool.
  P405: Store locked up.

- Disposal : P501: Dispose of contents/container to in accordance with local/regional/national/international regulations (to be specified).

3) Other hazard information not included in hazard classification
   - NFPA Rating system : Health: **2,** Flammability: **2,** Reactivity: **2**

3. Composition/information on ingredients

Chemical Name	Common name Synonyms	CAS No.	Content (%)
2-ETHYLHEXYL ACRYLATE	2-ETHYLHEXYL 2-PROPENOATE	103-11-7	>= 99.5

4. First-aid measures

1) Eye contact :
-Wash eyes immediately with large amounts of water.
-Remove contact lenses if present and easy to do.
-Get immediate medical advice/attention if irritating, pain, swelling, tear, dazzling eyes occur.

2) Skin contact
-Wash skin immediately with large amounts of water.
-Wash and dry carefully contaminated clothing and shoes before reuse.
-In case of contact with chemicals, get immediate medical advice/attention.

3) Inhalation
-Move victims immediately to place with fresh air and not contaminated area.
-If not breathing, give artificial respiration and have a trained individual administer oxygen.
-Get medical attention immediately if inhaled.

4) Ingestion
-If swallowed, immediately call a POISON CENTER or doctor/physician.
-Do NOT induce vomiting.

5) Acute and delayed symptoms/effects
-Inhalation:
short-term exposure: May cause irritation of respiratory and pulmonary organs.
-Skin contact :
short-term exposure: May cause severe skin irritation.
-Eye contact :
short-term exposure: May cause slightly eye irritation.

6) Indication of immediate medical attention and notes for physician
-Move victim to fresh air.
-Call 911 or emergency medical service.
-Give artificial respiration if victim is not breathing.
-Administer oxygen if breathing is difficult.
-Remove and isolate contaminated clothing and shoes.
-In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
-Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. Fire-fighting measures

1) Suitable (and unsuitable) extinguishing media
○ suitable extinguishing media:
-Small fire: Dry chemical, CO_2, water spray or regular foam.
-Large fire: Water spray, fog or regular foam.
○ unsuitable extinguishing media: Do not use straight streams
○ In case of major fire and large quantities:
-Dike fire-control water for later disposal.
-Move containers from fire area if you can do it without risk.

○ tank/trailer/train truck fire:
-Cool containers with flooding quantities of water until well after fire is out.
-Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
-ALWAYS stay away from tanks engulfed in fire.
-If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

2) Specific hazards arising from the chemical
○ Thermal decomposition products : irritating, corrosive and/or toxic gases, Carbon oxides
○ Fires and an explosion
-Some may burn but none ignite readily.
-Some may be transported hot.
-Containers may explode when heated.

3) Special protective equipment and precautions for fire-fighters
-Wear positive pressure self-contained breathing apparatus (SCBA).
-Structural firefighters' protective clothing will only provide limited protection.
-Runoff from fire control may cause pollution.

6. Accidental release measures

1) Personal precautions, protective equipment and emergency procedures
-CALL Emergency Response Telephone Number on Shipping Paper first.
If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
-As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
-Keep unauthorized personnel away.
-Stay upwind.
-Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

2) Environmental precautions and protective procedures
○ Atmosphere : Provide local exhaust ventilation system.
○ Land : Make an embankment for further processing.
○ Underwater : Prevent entry into waterways, sewers, basements or confined areas.

3) The methods of purification and removal
○ Small spill
-With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
-Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

○ Large spill
-Dike far ahead of liquid spill for later disposal.
-Cover powder spill with plastic sheet or tarp to minimize spreading.
-Prevent entry into waterways, sewers, basements or confined areas.

7. Handling and storage

1) Precautions for safe handling
-Wash contaminated clothing and Contaminated work clothing should not be allowed out of the workplace.
-Do not breathe gas/fumes/vapours/spray.
-Wash thoroughly after handling.
-Use certificated protective equipment.
-DO NOT eat, drink or smoke in product area.
-Avoid contact with skin, eyes and cloths.

2) Conditions for safe storage
-Store locked up.
-Keep in well-ventilated place.

8. Exposure controls/personal protection

1) Occupational Exposure Limits
○ Regulation in Korean: Not available
○ US (NIOSH/OSHA AGGIH):
- NIOSH- Not available
- ACGIH- Not available
○ Biological Exposure Index: Not available

2) Appropriate engineering controls
-Provide local exhaust ventilation system or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value.
-Check legal suitability of exposure level.

3) Personal protective equipment
○ Respiratory protection
-Respiratory protection: Wear NIOSH/MESA approved full or half face piece (with goggles) respireatory protective equipment.

○ Eye protection
-Wear facepiece with goggles to protect from scattering dust or toxic liquid.
-Further eye protection such as chemical goggles and/or protecting glasses must be worn when the possibility exists for eye contact due to splashing or spraying liquid or airborne particle.

○ Hand protection
-Wear appropriate chemical-resistant gloves that protect chemicals directly.

○ Body protection
-Wear appropriate protective chemical-resistant clothing.

9. Physical and chemical properties

1) Appearance	Physical state : Liquid Color : Colorless
2) Odor	Pleasant odor

3) Threshold of odor	0.02 mg/L
4) pH	Not available
5) Melting point/freezing point	-90 ˚C
6) Initial boiling point and boiling range	216˚C at 1,013 hPa 134˚C at 80 hPa
7) Flash point	82˚C
8) Evaporation rate	Not available
9) Flammability (solid, gas)	Not available
10) Upper/lower flammability or explosive limits.	Lower: 0.7% Upper: 8.2%
11) Vapour pressure	533.3 hPa at 192.2 ˚C 133 Pa at 50 ˚C 17.1 Pa at 20 ˚C
12) Solubility(ies)	9.6 mg/l at 25 ˚C
13) vapour density	6.35 (Air= 1)
14) Specific gravity	0.880 g/cu cm at 25 ˚C
15) n-octanol/water partition coefficient	log Kow = 4.09 (estimated)
16) Auto ignition temperature	245 ˚C (DIN 51 794)
17) Degradation temperature	Not available
18) Viscosity	Not available
19) Molecular weight	184.28 g/mol

10. Stability and reactivity

1) Chemical stability
- Avoid contact with heat and light. And Do monitor the contents of the inhibitor.

2) Possibility of hazardous reactions
- It may polymerize by heat, light, peroxide.

3) Conditions to avoid
-Containers may explode when heated.
-Avoid heat, sparks, open flames, or other sources of ignition.
-Put away from water supply and sewage.

4) Incompatible materials
-acid, base, oxidants, peroxides

5) Hazardous decomposition product
-Thermal decomposition product : irritating, corrosive and/or toxic gases, Carbon oxides

11. Toxicological information

Information of Health Hazardous:

○ Acute toxicity - Oral : Category 5, LD_{50}= 4435mg/kg (Rat)
- Dermal : Not classified, LD_{50}= 8480 mg/kg (Rabbit)
- Inhalation : Not classified
Valid data on acute inhalation toxicity tests are not available; but acute inhalation toxicity of 2-Ethylhexyl acrylate seems to be low. (Rat)

○ Skin Corrosion/ Irritation: Category 2
- 2-Ethylhexyl acrylate causes dermatitis the skin of human. A severe skin and eye irritant. Also It is strongly irritating to the skin of rabbits in studies on acute irritation, but should not be considered as corrosive.

○ Serious Eye Damage/ Irritation: Not classified
- 2-Ethylhexyl acrylate (purity 98%) caused mild eye irritation: 0.1 ml of the substance was instilled into the eyes of 3 rabbits, the following mean scores are documented for the 24, 48 and 72 observation times: cornea 0/0/0.3, iris 0/0/0.3, conjunctival redness 0.3/0/0.3, conjunctival chemosis 0/0/0.3. All signs of irritation were reversible within 3 days

○ Respiratory sensitizer: Not available

○ Skin Sensitization: Category 1
- 2-Ethylhexyl acrylate is moderately sensitising in guinea pigs. Sensitisation has also been reported in humans; however there is no indication of a high sensitising potency in humans.

○ Carcinogenecity: Not classified
- IARC: 3A, ACGIH-A4
- NTP, OSHA, Regulation 1272/2008, US EPA: Not listed
- 2-Ethylhexyl acrylate is not classifiable as to its carcinogenicity to humans.

○ Mutagenicity: Not classified
In vitro – Bacterial ames test(S. typhimurium): Negative
- Cytogenetic assay(Chinese Hamster Ovary Cells): Negative
- Mouse lymphoma assay(L5178Y-cells): Negative
- HGPRT assay: Negative

In vivo - UDS(unscheduled DNA Synthesis) Test : Negative (OECD TG 486)

○ Reproductive toxicity: Not classified
- The developmental toxicities of seven acrylates were studied in rats after inhalation exposure for 6 hr/day, during days 6 to 20 of gestation. The exposure concentrations were 50, 75, or 100 ppm. No treatment-related increases in embryo/fetal mortality or fetal malformations were observed after exposure to any of these acrylates. While there was evidence of maternal toxicity, no significant developmental toxic effects were observed after exposure to ethylhexyl acrylate at any concentration. These results indicate that inhaled ethylhexyl acrylate is not selectively toxic to the embryo or fetus.

○ Specific target organ toxicity (single exposure): Category 3(Respiratory irritation)
- 2-Ethylhexyl acrylate is considered to be a respiratory irritant. Ethyl acrylate/ vapors are highly irritating to the nose, eyes and respiratory tract. It can cause corneal lesions, and inspiration of high concentrations of the vapors can lead to pulmonary edema.

○ Specific target organ toxicity (repeat exposure): Not classified
- The inhalation of 2-EHA in rats was associated with degeneration of the olfactory mucosa in the dorsal and dorsolateral areas of the anterior parts of the nasal cavity.

○ Aspiration hazard: Not available

12. Ecological information

1) Aquatic Ecotoxicity
-Acute toxicity: Category 2
-Chronic toxicity: Not classified
○ Fish : 96hr-LC_{50}(*Oncorhynchus mykiss*) = 1.8mg/l (OECD TG 203)
○ Crustacea: : 48hr-EC_{50}(*Daphnia magna*) = 1.3mg/l (OECD TG 202)
○ Algae : 96hr-EC_{50}(*Sendesmus subspicatus*) = 47mg/l

2) Persistence and degradability
○ Persistence : high persistency (logKow=4.09(estimated))
○ Degradability: In contact with water, 2-EHA will hydrolyse slowly, whereas photo degradation in air will proceed rapidly (half-life= 19 hours)

3) Bioaccumulative potential: Based on an estimated log Kow and calculated BCF values, a potential for Bioaccumulation to be expected.
○ Biodegradation : 51% biodegradation after 14days (OECD 301C, Modified MITI Test(I))
○ Bioaccumulation : BCF=270~282.4, log Kow=4.09(estimated)

4) Mobility in soil
- high potency of mobility to soil (Koc=54954L/kg)

13. Disposal considerations

1) Disposal method
-Waste must be disposed of in accordance with federal, state and local environmental control regulations.

2) Disposal precaution
-Consider the require attentions in accordance with waste treatment management regulation.

14. Transport information

1) UN Number : Not classified as a dangerous good
2) UN Proper shipping name : Not applicable
3) Transport Hazard class : Not applicable
4) Packing group : Not applicable

5) Marine pollutant : Not applicable
6) Special safety response for transportation or transportation measure
○ Emergency schedule for fire : Not applicable
○ Emergency schedule for spillage : Not applicable

15. Regulatory information

○ Korea
- Korea Occupational Safety and Health Regulation: Not applicable
- Toxic Chemical Control Act. : Not applicable
- Dangerous Material Safety Management Regulation : Petroleum, class 4-3(non water solubility liquid, 2000L)
- Waste Control Act. : Not applicable

○ EU Classification
- Classification: Xi; R37/38 R43
- Risk phrases : R37/38, R43
- Safety phrases : S2, S36/37, S46

○ U.S.A. management information
- OSHA regulation (29CFR1910.119) : Not applicable
- CERCLA 103 regulation (40CFR302.4) : Not applicable
- EPCRA 302 regulation (40CFR355.30) : Not applicable
- EPCRA 304 regulation (40CFR355.40) : Not applicable
- SARA 313 regulation (40CFR372.65) : Not applicable

○ Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade : Not applicable
○ Stockholm Convention on Persistent Organic Pollutants (POPs) : Not applicable
○ Mont- real Protocol on Substances that Delete the Ozone Layer : Not applicable

16. Other information

1) Information source and references:

- ECB-ESIS (European chemical Substances Information System) (http://ecb.jrc.it/esis)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis)
- Organization for Economic Co-operation and Development (OECD) Screening Information Data Set (SIDS)
- IARC. Monographs on the Evaluation of the Carcinogenic Risk to Human: (http://monographs.iarc.fr/ENG/Classification/index.php)
- REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008
- Korea Occupational Health & Safety Agency: http://www.kosha.net
- U.S. National library of Medicine (NLM) Hazardous Substances Data Bank (HSDB): (http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm)
- ACGIH, TLV and BEIs # 0108, 2008
- The Chemical Risk Information Platform (CHRIP)
- UN RTDG: http://www.unece.org/trans/danger/publi/unrec/rev15/English/05E_Index.pdf
- Korea dangerous material inventory management system (http://hazmat.nema.go.kr)
- National chemicals information systems (http://ncis.nier.go.kr)

2) Issue date : 2011. 7. 26.

3) Revision number and date : 1997. 1. 20 (8th)

4) Other material safety data sheet information:
LG Chem LTD., Korea Occupational Health & Safety Agency

<History>

Rev. No.	Category	Revision Issue	Date	Respondent
5	ALL	Team leder Change	2006.01.15	Park chan kyo
6	1.3	Emergency response number Change	2009.08.17	Park chan kyo
7	ALL	For GHS Rule	2010.06.21	Park chan kyo
8	14.	Un no. Revise	2011.07.26	Yu seul bin
9	1.3	Address and Emergency response number change	2014.02.27	Gwak Byeongsoo